Having described the preferred embodiments, the invention is now claimed to be:

1. An apparatus (14) for re-ordering video data for a display, comprising:

a) a first transpose means (18) for receiving video data and performing a first transpose process on such video data to create partially re-ordered video data;

b) a means (20, 120) for storing the partially re-ordered video data; and

c) a second transpose means (22, 122) for reading the partially re-ordered video data and performing a second transpose process on such partially re-ordered video data to create fully re-ordered video data.

2. The apparatus as set forth in claim 1 wherein the first and second transpose means include:

one or more programmable hardware blocks.

3. The apparatus as set forth in claim 1 wherein: the first transpose means includes a first programmable processor and the second transpose means includes a second programmable processor, such that the apparatus is programmable for any of a plurality of display formats.

4. The apparatus as set forth in claim 3 wherein the first and second processors are fabricated on a common substrate (S).

5. The apparatus as set forth in claim 4 wherein the storing means (20, 120) includes computer memory which is fabricated on the common substrate.

6. The apparatus as set fourth in claim 4 wherein the storing means includes a separate IC that is electrically connected with the first and second programmable processors.

7. The apparatus as set forth in claim 3 wherein the first and second processors are programmable to re-order video data for two or more types of displays selected from the

group consisting of a transpose scan CRT display, an LCOS device, a PDP, a monochrome DMD, and a color DMD.

8. The apparatus as set forth in claim 1, the storing means (120) including:

a means (24, 26) for storing at least two consecutive frames of the partially re-ordered video data.

9. The apparatus as set forth in claim 8 wherein the second transpose means (22, 122) includes a processor programmed to read the partially re-ordered video data associated with a first frame from the storing means (120, 24, 26) while the first transpose means (18) writes the partially re-ordered video data associated with a second frame to the storing means (120, 24, 26).

10. The apparatus as set forth in claim 1, wherein the first transpose means (18) includes:

a means (28) for receiving RGB video data;

a means (30, 31) for writing the RGB video data to the storing means (20, 120);

a means (32) for separating RGB video data into separate R, G, and B video data; and

a means (30, 31) for writing the R, G, and B video data to the storing means (20, 120).

11. The apparatus as set forth in claim 10, the storing means (20, 120) including:

a means (40) for storing at least one frame of the RGB video data;

a means (42, 44, 46, 48) for storing at least one frame of the R separation video data, at least one frame of the G separation video data, and at least one frame of the B separation video data.

12. The apparatus as set forth in claim 11, the second transpose means (22) including:

a means (70) for addressing the RGB video data stored in the storing means (20, 120);

a means (72) for reading the RGB video data stored in the storing means (20, 120) to created fully re-ordered RGB video data;

a means (74) for communicating the fully re-ordered RGB video data to downstream modules of a display processing system;

a means (70, 76) for addressing the R, G, and B separation video data stored in the storing means (20, 120);

a means (78, 80, 82) for reading the R, G, and B separation video data stored in the storing means (20, 120);

a means (70, 76, 78, 80, 82) for re-ordering the R, G, and B separation video data into fully re-ordered R, G, and B color bar video data having consecutive downwardly scrolling R, G, and B scan lines; and

a means (74) for communicating the fully re-ordered R, G, and B color bar video data to downstream modules of a display processing system (10).

13. The apparatus as set forth in claim 12, the reading means (22) including:

a means (92) for identifying an operational configuration for the receiving means based on a selected display.

14. The apparatus as set forth in claim 10, the receiving means (18) including:

a means (34, 36) for generating a plurality of sub-fields associated with a frame of the received video data, wherein each sub-field includes sub-field video data associated with the received video data; and

a means (30, 31) for writing the sub-field video data for the plurality of sub-fields to the storing means (20, 120).

15. The apparatus as set forth in claim 14, the generating means (34, 36) including:

a means (129, 131, 133, 135) for temporarily storing a predetermined amount of sub-field data that is generated serially, wherein the writing means (30, 31) transfers the predetermined amount of sub-field data from the temporary storing means to the storing means (20, 120) in parallel.

16. The apparatus as set forth in claim 14, the storing means (20, 120) including:

a means (50, 52, 54) for storing the sub-field video data for the plurality of sub-fields.

17. The apparatus as set forth in claim 16, the reading means (22) including:

a means (70, 88) for addressing the sub-field video data for the plurality of sub-fields in the storing means (20, 120);

a means (90) for reading the sub-field video data for the plurality of sub-fields in the storing means (20, 120) to create a fully re-ordered sub-field video data; and

a means (74) for communicating the fully re-ordered sub-field video data to downstream modules of a display processing system (10).

18. The apparatus as set forth in claim 14 wherein the sub-fields are RGB sub-fields and the sub-field data is RGB sub-field data.

19. The apparatus as set forth in claim 14, the generating means (34, 36) including:

a means (141, 143, 145, 147) for temporarily storing a predetermined amount of RGB sub-field data that is generated serially, wherein the writing means (30, 31) transfers the predetermined amount of RGB sub-field data from the temporary storing means to the storing means (20, 120) in parallel.

20. The apparatus as set forth in claim 18, the storing means (20, 120) including:

a means (51, 53, 55) for storing the RGB sub-field video data for the plurality of RGB sub-fields.

21. The apparatus as set forth in claim 20, the reading means (22) including:

a means (70, 88) for addressing the RGB sub-field video data for the plurality of RGB sub-fields in the storing means (20, 120);

a means (91) for reading the RGB sub-field video data for the plurality of RGB sub-fields in the storing means (20, 120) to create a fully re-ordered RGB sub-field video data; and

a means (74) for communicating the fully re-ordered RGB sub-field video data to downstream modules of a display processing system (10).

22. The apparatus as set forth in claim 10, the receiving means (18) including:

a means (34, 36) for generating a plurality of R separation sub-fields associated with a frame of the R separation video data, wherein each R separation sub-field includes R separation sub-field video data associated with the R separation video data;

a means (34, 36) for generating a plurality of G separation sub-fields associated with a frame of the G separation video data, wherein each G separation sub-field includes G separation sub-field video data associated with the G separation video data;

a means (34, 36) for generating a plurality of B separation sub-fields associated with a frame of the B separation video data, wherein each B separation sub-field includes B separation sub-field video data associated with the B separation video data; and

a means (30) for writing the R separation sub-field video data for the plurality of R separation sub-fields, the G separation sub-field video data for the plurality of G separation sub-fields, and the B separation sub-field video data for the plurality of B separation sub-fields to the storing means (20, 120).

23. The apparatus as set forth in claim 22, the storing means (20, 120) including:

a means (56, 58, 60) for storing the R separation sub-field video data for the plurality of R separation sub-fields;

a means (56, 62, 64) for storing the G separation sub-field video data for the plurality of G separation sub-fields; and

a means (56, 66, 68) for storing the B separation sub-field video data for the plurality of B separation sub-fields.

24. The apparatus as set forth in claim 23, the reading means (122) including:

a means (70, 88) for addressing the R separation sub-field video data for the plurality of R separation sub-fields in the storing means (20, 120);

a means (94) for reading the R separation sub-field video data for the plurality of R separation sub-fields in the storing means (20, 120) to create fully re-ordered R separation sub-field video data;

a means (74) for communicating the fully re-ordered R separation sub-field video data to downstream modules of a display processing system (10);

a means (70, 88) for addressing the G separation sub-field video data for the plurality of G separation sub-fields in the storing means (20, 120);

a means (96) for reading the G separation sub-field video data for the plurality of G separation sub-fields in the storing means (20, 120) to create fully re-ordered G separation sub-field video data;

a means (74) for communicating the fully re-ordered G separation sub-field video data to downstream modules of a display processing system (10);

a means (70, 88) for addressing the B separation sub-field video data for the plurality of B separation sub-fields in the storing means (20, 120);

a means (98) for reading the B separation sub-field video data for the plurality of B separation sub-fields in the storing means (20, 120) to create fully re-ordered B separation sub-field video data; and

a means (74) for communicating the fully re-ordered B separation sub-field video data to downstream modules of a display processing system (10).

25. The apparatus as set forth in claim 10, the receiving means (18) including:

a means (38) for identifying an operational configuration for the receiving means based on a selected display.

26. An integrated circuit for re-ordering video data to a selected display format, the integrated circuit comprising:

a substrate;

a first programmable processor fabricated on the substrate and connected with video input and programming terminals;

a second programmable processor fabricated on the substrate and connected with video output and programming terminals;

a memory electrically connected with the first and second processors to have data written into the memory from the first processor and read out of the memory by the second processor.

27. The integrated circuit as set forth in claim 26 wherein the memory is fabricated on the substrate.

28. A method of converting video data from a first format to a second format comprising:

programming a first processor with a first transform which transforms the first format video data to an intermediate format data for storage in a memory;

programming a second processor with a second transform which transforms the intermediate format data from the memory into the second video format.

29. The method as set forth in claim 28 further including:

supplying the first format video data to the first processor;

transforming the supplied first format video data to the intermediate format data with the first processor;

writing the intermediate format data to the memory;

reading the intermediate format data from the memory with the second processor and transforming the intermediate format data to the second format video data.

30. The method as set forth in claim 28 further including:

fabricating the first and second processors and the memory on a common substrate.